NOTES ON AUSTRALIAN MUSCOIDEA, VI.

CALLIPHORA IN AUSTRALIA AND NEW ZEALAND.

By G. H. Hardy, Department of Biology, University of Queensland.

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Compared with European and North American species, the Australian Calliphoras have a diverse appearance causing early authors to regard them as belonging to several distinct genera. Each important constituent in this fauna has been given one or more generic names, and colour seems to have been the chief recognition factor. More modern authors have attempted to advance beyond this plan. W. S. Patton (1934-5) adopted *Calliphora sensu lato* as his basis of study and he used a few characters of the terminalia for purposes of subdivision, resulting in the formation of three groups, each containing species diverse in appearance and structure. D. Miller (1939), taking a very conservative view, regards the terminalia as being liable to variation, and thus small differences used for subspecific determination are inconstant; at best he could admit only two subgenera in New Zealand, based upon bare and hairy eyes which admittedly gradate from one to the other. Hardy (1937), using colour characters for main divisions, attempts subdivision on such terminal characters as might run parallel with colour, thus keeping together species that are obviously related.

The New Zealand fauna falls into three divisions, namely, *Calliphora* with one introduced species, *Neopollenia* with two species, and all the rest included under *Neocalliphora,* being limited to these islands; whilst the orange or yellow thoracic spiracle can be used for subgeneric discrimination. The Australian *Onesia* species possibly form a complex, and if so, a few may have affinities with *Neocalliphora*; but terminal characters, more detailed than those given by Miller, are needed. The Australian *Adichosia* also seems closely related to *Neocalliphora.*

The following generic names have been proposed for these two faunas:—

Onesia Desvoidy 1830: type *Musca sepulchralis* Meigen, Europe. This name has precedence over *Calliphora,* and the range of the genus probably includes Australia but not New Zealand. In the present studies the name is used for convenience.

Calliphora Desvoidy 1830: type *Musca erythrocephala* Meigen, Europe.

? Anastellorhina Bigot 1885: type *bicolor* Bigot, Australia. This is said to be *C. augur* Fab., but Townsend, who saw the type only through the glass of the cabinet drawer, may have seen *Lucilia fergusoni* Patton, which needs close examination to distinguish it from *C. augur.*

Neopollenia Brauer 1889: type *Musca stygia* Fabricius, Australia.

Neocalliphora Brauer & Bergenstamm 1891: type *Musca quadrimaculata* Swederus, New Zealand. Originally based on its hairy eyes and covered *Adichosia.*

Adichosia Surcouf 1914: type *Ochromyia hyalipennis* Macquart (preocc.); Tasmania is the quoted type-locality, but probably it was from Sydney; and the fly is generally regarded as being *Calliphora ochracea* Schiner, the species being misquoted as the type of *Neocalliphora* by various recent authors.

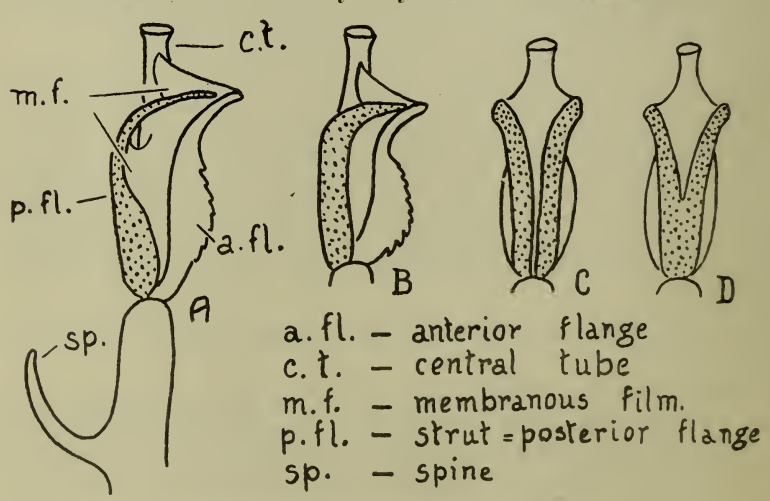
Proekon Surcouf 1914: type *Ochromyia lateralis* Macquart, Australia. The species is generally understood to be *C. augur* Fab., and the name may be a synonym of *Anastellorhina*.

Trichocalliphora Townsend 1915: type *C. villosa* Desvoidy, Australia. This is presumed to be *C. stygia* Fab., and later Townsend placed the name as a synonym of *Neopollenia*.

Paracalliphora Townsend 1916: type *C. oceanea* Desvoidy, Oceanic islands and Australia. The identity of the type is not known, but Townsend based his description on specimens which are presumed to be *C. augur* Fab. The generic name is a synonym of *Proekon*, and hence possibly of *Anastellorhina*.

Xenocalliphora Malloch 1924: type *C. eudypti* Hutton (preocc.), New Zealand. The species is now known as *X. viridiventris* Malloch, of which only the female is known.

Philonesia Bezzi 1927: type *Pollenia aureonotata* Macquart, New Zealand, which is a synonym of *C. hortata* Walker.



EXPLANATION OF TEXT-FIGURES.

The diagrams represent the main features in the structure of the second segment of the aedeagus, and the form taken by the struts (posterior flange), which are stippled. Figs. A and B are as seen from the lateral position, and figs. C and D as seen posteriorly.

A illustrates a free strut detachable from the socket in the anterior flange. Each has a membrane (*m.f.*) that joins it to the central tube (*c.t.*), at the apex of which occurs the genital orifice. The basal segment of the aedeagus is also given to show the spine (*sp.*).

B shows the strut as normally found, bound in with the rest of the aedeagus; and such struts occur in two forms, shown in:—

C, with the struts separated one from the other; and

D, with the struts fused together at their base, the length of fusion varying with the species.

KEY TO SUBGENERA OF CALLIPHORA BASED UPON CHARACTERS IN THE AEDEAGUS.

1. Struts free at the apex and separated from each other at the base (as in figs. A and C respectively) 2
   Struts fused for their full length with the central tube of the aedeagus 3

2. Struts tapering to a pointed apex to where the attached membrane reaches. *Adichosia* and probably *Neocalliphora*.
   Struts similar but the attached membrane is short (as in fig. A). *Neopollenia stygia*-group.
   Struts expanded at the apex and the attached membrane short. *Calliphora*.

3. Struts distinctly separated at their base (as in fig. C). *Neopollenia* (other groups) and *Proekon*.
   Struts fused together at their base for an appreciable distance (as in fig. D but varying in length of fusion with the species). *Onesia*.

Only some of the species of *Onesia* have been examined for the cited character and these conform, but it seems possible that gradations will be found in the future leading to *Neocalliphora*.

Subgenus ADICHOSIA.

On *C. ochracea* Schiner, the aedeagus has its apical segment hinged in the normal way upon the basal segment which carries the spine (fig. A, *sp.*). The apical segment is in the form of a membranous central tube with the genital orifice at its apex, and is supported by four flanges, the bases of which are embedded in the membrane whence they arise and spread slightly outwards, retaining connection with the tube by membrane (fig. A, *m.f.*) partly filled with fatty matter that gives rigidity to the whole segment. The rear pair of flanges is in the form of a pair of highly chitinised struts (stippled in the figures), adjacent at their base, and ending in a curve that brings the apex of each strut into a socket on the anterior flange. The anterior flanges arise from the base and flank that bulging part of the central tube which pulsates when in action, and similarly they curve forwards, each ending in a point anteriorly directed. Another membrane is attached to these, joining them to the apical part of the central tube.

Comparing this with *C. erythrocephala* and allied species, Patton (1935) described the aedeagus as having "the struts slender and ending in a similar expansion, but not free as on the European and American species; the ends attached to membrane." If by this is meant not free from the anterior flange, then Patton evidently misunderstood the structure; further, the strut does not end in a similar expansion, but tapers to a point, as his drawing shows. The membrane attached to the strut differs from that of *C. erythrocephala* and also of the *stygia*-group (fig. A, *m.f.*) by reaching the apex of the strut, but this in no way alters the relation between the strut and the anterior flange other than by making it not so easy to detach. This character has been confirmed on a male captured in Brisbane on the 5th July, 1945, the struts being released from their socket without breaking that attached membrane, the shape being like that of Patton's drawing where it is traceable as slightly sinuous and without trace of an expansion. Patton gives two drawings of the condition on *C. erythrocephala*, in both of which the strut is shown as disconnected from the socket on the anterior flange; and the figure by Miller shows the strut retained in the socket.

Subgenus Neopollenia.

On the *stygia*-group, the strut can be very readily released from its socket, and the membrane attached stops far short of the apex as seen in fig. A. In all other groups the struts are fused with the central tube for their whole length as in fig. B, just as they are on all species of *Proekon* yet examined.

Brauer and Bergenstamm (1891, p. 440) state "*stygia* Schin Nov. *Calliphora,* Sydney. = *vittata* Macq. (*Pollenia*)." I fail to trace *P. vittata* Macquart, nor have I seen further references to it. so I presume this is a manuscript name.

An error occurs in the key to species (Hardy 1937, p. 19) where *fulvithorax* should read *fulvicoxa*; also one species needs a new name, which is given below.

Calliphora (*Neopollenia*) *maryfulleri* new name.

Musca australis Boisduval 1835, Voy. l'Astrolabe Ent. ii. 669—preoccupied by Gmelin in Linn. Syst. Nat. ed. 13, i (1790), 2833.

Being unable to find a valid name for this well-known Western Australian species, I have chosen one for it to commemorate the late Mary E. Fuller, who carried out research on blowflies in Western Australia and discovered this fly in the process.

A Correction.

In figure 25, on page 63 of the *Proceedings of the Royal Entomological Society of London,* series A, vol. 19, 1944, an error has been made by inadvertently placing the sclerite formation of *Sarcophaga* around the aedeagus of *Calliphora.*

On *Sarcophaga,* part of the sixth tergite and sternite are withdrawn into the genital cavity and form the entrance to the phallic pouch, as shown in that figure. There is no seventh tergite. Another remnant of the sixth tergite has been traced by Patton in a very small sclerite between T_5 and S_7, and this seems to be all the sclerite remnant preserved in that position.

On *Calliphora* there is a considerable sixth tergite between T_5 and S_7, but the chitinous border of the phallic pouch has lost both tergite and sternite. Instead, the pouch entrance is bordered below by the seventh tergite (T_7) and no sclerite is present to mark the upper limits of the phallic pouch. Thus it will be seen that in the original condition, as on Syrphidae, the phallic pouch lies in the lateral area of the sixth segment, having the lateral edge of the tergite and sternite to mark the border of indentation. This is preserved on *Sarcophaga,* but it is lost on *Calliphora,* where the phallic pouch is altered by the seventh tergite marking its posterior limit.

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